

CLAIMS

1. A method for producing composite materials, such as thermoplastic resins with mineral and/or vegetable fillers, characterized in that it consists in feeding a mineral and/or vegetable filler, preheating said filler, feeding a
5 melted thermoplastic resin onto said filler, introducing the mixture of said filler and said thermoplastic resin in an extruder, subjecting the mixture to high compression, producing a high partial vacuum, and compressing the mixture in an extrusion head, out of which the material to be subjected to subsequent treatments flows.
- 10 2. The method according to claim 1, characterized in that said mineral and/or vegetable filler is heated to a temperature from 20 to 160°.
3. The method according to the preceding claims, characterized in that said resin is present in a percentage from 25 to 70% of the material being obtained and said filler is present in a percentage from 75 to 30%.
- 15 4. The method according to one or more of the preceding claims, characterized in that degassing is performed during the high compression step.
5. The method according to one or more of the preceding claims, characterized in that said thermoplastic resin mixed with said filler is
20 introduced in a mixer that is adapted to increase the exposed surface of said mixture for degassing and wetting the filler.
6. The method according to one or more of the preceding claims, characterized in that a second degassing is performed when said high partial vacuum step is performed.
- 25 7. The method according to one or more of the preceding claims, characterized in that it provides for the introduction of processing waste in a maximum quantity of 30%.
8. The method according to one or more of the preceding claims, characterized in that said filler is formed by powder or fibers.
- 30 9. The method according to one or more of the preceding claims,

characterized in that said fibers of said filler have a length from 3 to 20 mm.

10. The method according to one or more of the preceding claims, characterized in that said extrusion screw, in the step for melting the 5 thermoplastic resin, has an axial extension of substantially 20 diameters, and the second compression and partial vacuum portion has a length of substantially 14 diameters including the end portion for final extrusion.

11. The method according to one or more of the preceding claims, characterized in that said thermoplastic resin is fed by means of an extrusion 10 screw that is provided in axial alignment with the extruder, at least part of said melted thermoplastic resin being introduced in said filler before introduction in said extruder, the remaining part being introduced in said extruder.

12. The method according to one or more of the preceding claims, 15 characterized in that said melted thermoplastic resin is fed by an extrusion screw that is separate with respect to the extrusion screw for processing the mixture of thermoplastic resin and filler.

13. An apparatus for producing composite materials such as thermoplastic resins with mineral and vegetable fillers, characterized in that 20 it comprises an extrusion screw that has a first part for plasticizing and melting a thermoplastic resin, said extruder being connected, at the end of said first part, to the end portion of a feeder of mineral and/or vegetable fillers for mixing the filler and the thermoplastic resin before introduction in the extruder.

25 14. The apparatus according to claim 13, characterized in that said extrusion screw has a second portion that forms a region of high compression and then a partial vacuum region.

15. The apparatus according to one or more of the preceding claims, characterized in that it comprises, between said high compression region 30 and said high partial vacuum region, a mixer that is adapted to increase the

exposed surface of said mixture.

16. The apparatus according to one or more of the preceding claims, characterized in that said mixer has a plurality of channels that are arranged substantially parallel to the axial direction and form a reduced cross-section
5 with respect to the useful upstream cross-section for feeding the material.

17. The apparatus according to one or more of the preceding claims, characterized in that it comprises an auxiliary inlet for introducing a second thermoplastic resin.

18. The apparatus according to one or more of the preceding claims,
10 characterized in that it comprises, at the outlet of said extrusion head, a profile head for obtaining finished articles.

19. The apparatus according to one or more of the preceding claims, characterized in that it comprises, at the outlet of said extrusion head, a sheet head, downstream of which calendering rollers are arranged.

15 20. The apparatus according to one or more of the preceding claims, characterized in that comprises, downstream of said extrusion head, a press with molds for forming manufactured articles.

21. The apparatus according to one or more of the preceding claims, characterized in that it comprises a spaghetti head for producing granules.